DOCUMENT RESUME

ED 475 425 HE 035 760

AUTHOR	Sharma, Raj; Constantine, Richard
TITLE	Falling into or through the Web: Student and Staff Perceptions of IT Infrastructure in a Technological University.
PUB DATE	2002-06-00
NOTE	11p.; Paper presented at the Annual Forum for the Association for Institutional Research (42nd, Toronto, Ontario, Canada, June 2-5, 2002).
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	*Access to Computers; *College Faculty; College Students; Foreign Countries; Higher Education; *Information Technology; Student Attitudes; *Teacher Attitudes; *User Satisfaction (Information); Vocational Education
IDENTIFIERS	Australia

ABSTRACT

In a vocationally oriented institution, such as the Australian institution that is the subject of this case study, the maintenance and enhancement of the information technology (IT) infrastructure is very important in terms of both the core business of the institution (teaching and learning and research) and the support activities. Tertiary institutions need to pay particular attention to the computer services technology requirements of their key users. This paper reports on a study of students and staff at an Australian University of Technology to identify ways of maintaining the accessibility of these stakeholders to the computer resources of the institution. A survey of staff perceptions of IT services was completed by 11 faculty members. A significant majority thought that over the past 6 months there had been a steady decline in the reliability of the university's computer systems and data network infrastructure. Faculty suggested various reasons for this decline, and these responses were separated by sex and age group to provide a more complete picture of faculty user needs. Student attitudes about IT infrastructure were derived from a university questionnaire completed by a large section of the student body to evaluate many university services. Comparisons were made between 1999 and 2000 surveys. Students recognized that the availability of computing facilities was increasing, and overall, students' perceptions of IT facilities at the university rose. The shortcomings identified by the faculty, however, show the need for a major rehabilitation of university IT facilities. (SLD)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 475 425

AIR 2002 CONFERENCE
2-5 JUNE 2002

FALLING INTO OR THROUGH THE WEB: STUDENT AND STAFF PERCEPTIONS OF IT INFRASTRUCTURE IN A TECHNOLOGICAL UNIVERSITY

AUTHORS: DR. RAJ SHARMA and

MR. RICHARD CONSTANTINE
DIRECTOR OF INFORMATION TECHNOLOGY SERVICES
SWINBURNE UNIVERSITY OF TECHNOLOGY.
TELEPHONE: +61 3 9214 4888
FAX: +61 3 9214 8888
EMAIL:rconstantine@swin.edu.au

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

D. Nira

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

PRESENTER: DR RAJ SHARMA

ADDRESS FOR CORRESPONDENCE:
ASSOCIATE DIRECTOR
RESOURCE PLANNING AND ANALYSIS
SWINBURNE UNIVERSITY OF TECHNOLOGY
P O BOX 218
HAWTHORN VIC 3122
AUSTRALIA

TELEPHONE: (03) 9214 8658
FAX: (03) 9214 8636
EMAIL: rsharma@swin.edu.au

TYPE OF PRESENTATION: FULL PAPER

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☒ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

H6B57160

BEST COPY AVAILABLE

FALLING INTO OR THROUGH THE WEB: STUDENT AND STAFF PERCEPTIONS OF IT INFRASTRUCTURE IN A TECHNOLOGICAL UNIVERSITY

ABSTRACT

In a vocationally oriented institution, such as the Australian case study organisation, the maintenance and enhancement of the IT infrastructure is very important both in terms of the core business of the institution (teaching and learning and research) and the support activities. Accordingly, tertiary institutions need to pay particular attention to the computer services technology requirements of their key users. This paper reports on a survey of students and staff undertaken within an Australian University of Technology with view to identifying ways of maintaining accessibility of these stakeholders to the computer resources of the institution.

INTRODUCTION

The Case Study Organisation is a University of Technology located in a South East Australian State. The University is located in a megalopolis that is a multicultural city and one that is regarded as a centre for higher learning in Australia. It is located in a State that has nearly one third of all International Students enrolled in Australia. A unique feature of this University is that it is a multi-sectoral Institution that offers programs ranging from Certificate and Diploma Courses in the Vocational Education and Training Sector to Doctorate level programs from the Higher Education sector. Since the University of Technology offers Vocational and Research programs in Information Technology, its quality of IT infrastructure is regarded as being very important and has significance for its Teaching and Research programs.

Up until 1998 the University's IT infrastructure services were relatively fragmented. The central IT areas were segmented into two departments including an Applications Management Services Group and the Computer Network Services Group. Further, at that time the majority of IT spending was under the control of individual departments leading to their purchase of hardware and software that were not compatible across the Institution. In 1998, the Chancellery of the University commissioned a major review of the Information Management Organisation within the Institution. The review recommended the following changes to improve the IT Service delivery across the University:

- A clearer definition of the IT Services across the University and the associated responsibilities for delivering the services.
- Consolidating the two Central Departments into one Information Technology Services Organisational Unit in order to create focus and clarity for IT across the University.
- Implementing an internal market place service delivery process for IT Services (user pays).
- Developing a base service statement and subsequently negotiating the Service Level Arrangements between the central IT Department and other users to align the requirements and expectations of the users with the services being delivered by the Central Department.

Given that a review was concluded three years ago and various strategies have been implemented progressively, its now time to take stock and analyse what has been achieved with view to identifying gaps that can be filled in the future. Accordingly, it is the purpose of this paper to present the perceptions of students and staff of their current IT environment within the University.

LITERATURE REVIEW

Beeharry and Schneider (1996) in reporting about a study at the University of Mauritius, highlight the lack of users support services in University computer centres. In particular they suggest that often the necessary hardware and software are put in place with the new user simply wondering how to obtain such promised services. Beeharry and Schneider (1996) suggest that for learners to use the computer network system affectively, there needs to be user training covering wide range of network services such as email, file and printer service, FTP, as well as access to Internet, world wide web and online databases.

Ballantyne (1998) undertook a survey of students' perceptions regarding the use and access to computers both on and off campus. The study found that overall the students were positive about computing facilities on campus. However, it was found that the main areas for complaints by students included lack of sufficient computers, particularly in general computing lab, and printers. Ballantyne

(1998) also found that off campus access to both computers and Internet was high but that access via the University server was not rated well.

Peebles and Antolovic (1999) state that there is sufficient data to reach the following opposite conclusions about IT:

- Information Technology adds value to the work of most enterprises.
- IT destroys vale in most of the enterprises where it has been deployed.

Part of the reasons for the latter include poorly designed applications, informative www pages with their inevitable broken links, opaque decisions support systems and poor quality hardware which can destroy value and increase costs by a consumption of large unproductive blocks of users time. Peebles and Antolovic (1999) indicate that one of the crucial defences against destruction of value by IT is a strong organisation for the education and support of those who use computers and who gather information from various network resources. They again appear to emphasis the critical role of staff development in terms of Information Technology knowledge in use. Peebles and Antolovic (1999) also state that user perceptions of quality of IT services have not been measured in most enterprises, including Higher Education. This paper reports on perceptions of tertiary education students and staff perceptions of IT services facilities and hopefully will help to bridge some of the gap in terms of our knowledge regarding the measurement of quality of IT support in universities.

A recent study at the George Mason University (http:\\www.gmu.edu/news/gazette/0011/iteval.html) reported on an evaluation of the university's Information Technology unit. The study reported on some good findings for the university including that between 30% and 35% of the customer satisfaction surveys were very positive and had no suggestions for improvements with another 30% to 35% of the responses offering constructive no cost or low cost suggestions on how to improve a particular service. However, the not so good news from the survey for the University was that its capacity to execute projects on time and within budget to the satisfaction of its customers was found to be weak. The problem was attributed to many causes including the extraordinary growth of the University and insufficient IT staff to meet the customer demand. It suggests that the latter may be due to the practice of pulling IT staff off projects to assist with Help Desk or Field Services where staff shortages were particularly acute.

METHODOLOGY

The University has instituted a subject evaluation system to provide a source of evidence of the effectiveness of its Teaching and Learning and to create an environment where participants can constructively contribute to the improvement of the educational process, to facilitate the process of improvement of course delivery, to facilitate curriculum development and to encourage best practice in teaching and course delivery. The Office of Quality Education evaluates all university subjects within a two semester evaluation cycle. Inter alia, the survey instrument requires the students to indicate on a five point Likert scale (1 = strongly disagree and 5 = strongly agree) whether the student had easy access to computer resources within the university and for the particular subject concerned. The Quality Unit provided the relevant data file to the researchers for further analysis and this forms part of the basis of the study.

Teaching and Learning requires involvement of not only students but staff as well. Accordingly, a survey of staff perceptions of the Information Technology environment was also undertaken during early 2001. A survey instrument was drafted, piloted with a few staff and then set up on the website of the Information Technology Services Unit with a request for staff to respond. A total response of 111 was received. The characteristics of the respondents are considered in one of the following sections.

The student and staff responses were analysed statistically using software available on a PC. This being the first study of this kind at the University, the project should be regarded as being exploratory in nature rather than "hypothesis testing".

PERCEPTIONS OF INFORMATION TECHNOLOGY SERVICES BY UNIVERSITY STAFF

As previously stated, during early 2001, a survey of staff perception of Information Technology Services was undertaken through the use of the website. 111 staff responded from a total population of just less than 2000, giving a response rate of 5.6%. Therefore some caution should be exercised in interpreting the information provided. For instance, the sample may not be representative of the total population.

As well as collecting staff perceptions of computer facilities and the like on campus, some demographic data was also collected. It revealed that 55% of the sample were females whereas in the total population 49% were females. Thus female staff are slightly over represented in the sample. In the sample, 31.5% were derived from support units, 33.3% from Higher Education Teaching and Research Divisions and 34.2% from the Technical and Further Education Division (the non-degree granting part of the multi sector university). It is noted that in the total population 26% of staff are from support units so they appear to be slightly over represented. Regarding the Teaching and Research areas, the Higher Education (33.3%) appears to be over represented relative to the total population (25.2%). So the sample appears to be heavily biased towards the degree granting part of the multi sector university rather than the non-degree Teaching and Learning centre. However, this may be reflecting the more intensive use of Information Technology in the Higher Education sector relative to the technical and further education sector. Regarding age profile of respondents, the very young staff (25 and under) constituted 7.2% of the sample and 7.4% in the total population – a reasonable representation. However, the 26 to 30 age group (17.1%) were grossly over represented in the sample relative to their total population (9.4%). Contrastingly the 31 to 40 age group was significantly under-represented in the sample (11.7%) in comparison to the total population (25.5%). However the over 40 age group in the sample (64%) compared favourably with that in the total population (58%).

The next series of questions probed the current state of the University's computer systems and data network infrastructure and ascertain possible solutions to perceived problems. Staff were asked to indicate on a four point scale (strongly agree to strongly disagree) their degree of agreement to various statements given.

A significant majority of female (70.4%) and male respondents (69.8%) agreed with a statement that over the past six months there had been a steady decline in the reliability of the University's computer systems and data network infrastructure. These relatively uniform results from the genders were not reflected when one segments the responses by age. In particular, a larger proportion of the younger age group (age 30 or less) (82.6%) agreed that there had been a decline in the reliability of the IT infrastructure than the older staff (66.2%). Perhaps this may be due to the greater usage of IT facilities by younger population, making them probably more critical of the facilities than the older population. The respondent who agreed that there had been a decline was also requested to consider possible reason for this decline in IT infrastructure performance at the university. Accordingly, it is not surprising that a very high proportion of the staff who agreed with the perceived decline in IT performance also agreed with the following statements:

- That there had been a proliferation of low cost, low availability file servers (92% of female respondents agreed and 93% of males agreed).
- The decline was due to little or no redundancy in the data network (all respondents agreed with this statement).
- Due to inadequate cabling infrastructure (92% of female respondents and 86% of males agreed with this as their reason for the decline).

The statements regarding the possible decline in IT performance were followed by others that probed various reasons of the decline in IT performance and some possible solutions. A very high proportion of female (74%) and male (89%) agreed that during peak enrolment periods it takes far too long to access the finance or student system, which are effected quite dramatically at the university. This perhaps reflects staff frustration at the lack of responsiveness of the IT system when the student transactions reach a maxima during peak enrolment periods. There was also significant degree of agreement between females (88.5%) and males (80.6%) that there was a heavy network congestion leading to data link failure at the university. However, more females (97.1%) than males (77.1%) agreed with a suggestion that the university needs to replace the Novell Servers with updated and more reliable servers. There was overwhelming support from both females (93.8%) and males respondents (90.9%) that there was a need to upgrade and refresh the existing network infrastructure in order to address the previously mentioned perceived problems with the performance of the IT system. Further all the women (100%) and most of the men (90.2%) agreed with the need to install redundant links to all campuses of the institution to ensure campus service is continued in the event of a failure with the university's intra campus microwave link. There was also high degree of perceived need to ensure multiple/dual fibre paths to all buildings both in terms of women (100%) and men (93.5%). Similarly a very high degree of support was noted from women (96.8%) and men (80%) for the need to convey its networks for data, voice and video through standardisation based on a single Internet protocol. Examination of this responses according to age groups again suggests a relatively high degree of support for the various proposals to improve the performance of the Information Technology Services within the university except perhaps in one case related to some of the symptoms of the relative decay in IT infrastructure. In particular, the older age group (greater than 30 years of age) overwhelming a agreed with the proposition that during peak enrolments periods it takes far too long to access the finance or student system (89.3%) but there was a smaller though majority support for this proportion by the younger age group (less than 30 years–53.5%).

The next couple of questions sought staff advice as to where they access the World Wide Web and electronic mail. The vast majority of female staff (83.6%) and male respondents (88%) access the

worldwide web at work with lesser proportion accessing the web at home in terms of females (14.8%) and males (12%). Similarly even a greater proportion of female staff (96.7%) and males (96%) access electronic mail at work. In deed a very small proportion of female staff (3.3%) and males (4%) use electronic mail at home. There were no significant variations to this pattern in respect of age distribution except that a significantly greater proportion of the older age group (greater than 40 years) access the World Wide Web (16.7%) at home than the younger population (3.7%).

The next series of questions sought the respondent's confidence in their ability to use various software and the like. In terms of word-processors, both females (75.4%) and males (84%) were very confident in the utilisation of this software. However, in terms of the graphic/drawing software applications, most females (60.7%) and a significant number of males (34%) had little or no confidence in the use of this software. Indeed only 34% of males and 13% of females were very confident in using graphic/drawing programs. Clearly this suggests a need for staff development by the university in raising the knowledge level of this particular software. A greater proportion of males (86%) than females (59%) was very confident in the use of World Wide Web browser at the university. In terms of the use of electronic mail the vast majority of female respondents (73.8%) and males (86%) were very confident in accessing email. A majority of males (52%) but a minority of females (37.7%) was very confident in the use of spreadsheet applications. Indeed nearly 30% of females had little or no confidence in the utilisation of spreadsheets. Again this appears to be an area of perhaps targeted staff development requirement for university female staff. Only a minority of female (32.8%) and male (30%) of staff were very confident in the use of databases. Indeed a very significant proportion of females (29.5%) and males (22%) had little or no confidence in the utilisation of the university's databases. Given that the university's student, staff and financial systems are provided in various databases, this finding is a source of serious concern to the university. Regarding segmentation of university user confidence in the utilisation of these applications by age, a clear trend emerges. In every single case, the younger staff exhibit greater confidence in the use of software than older staff. For instance, although 93% of the younger age group (less than 30 years) were very confident in the use of word processors, only 75% of the older age group expressed great confidence in the use of this software.

Virtually all female staff (98.4%) and males (96%) access their computer at work on a daily basis. Only 29.5% of women and 38% of men felt that the university's IT staff were definitely responsive to their needs. This is not a good finding in terms of the delivery of IT services at the university. A bit more positive response was received from the respondents with the issue of how comfortable they felt in approaching the Information Technology Service Help Desk when something went wrong. Indeed 44.3% of women and 46% of men were definitely confident in approaching the Help Desk under these circumstances. Still not a glowing endorsement of the Help Desk Service delivery. The survey also sought the staff opinion regarding how they prefer to make requests to the Information Technology Services Department on Campus. The majority of female staff (63.9%) and males (68%) prefer to make request by phone with significant proportions preferring face to face requests (16.4% women and 14% men) and email (18% women and 12% men). A slightly higher proportion of the older age group (31 years and over – 67.9%) prefer to make IT requests via phone then the younger population (59%). Conversely a greater proportion of the younger age group prefer to use face to face contacts (18.5% versus 14.3%) and email (18.5% versus 14.3%).

The next series of questions sought staff preferred response time to various IT issues and problems. Regarding hardware/printing problems, female respondents were more demanding requiring IT support turnaround in minutes (47.5%) in comparison to males (24%); the majority of males were prepared to wait for hours in terms of hardware/printing problems (50%) with a lesser proportion of female staff wishing to wait for hours (42.6%). Further, 24% of males and 9.8% of females could wait for one day in terms of turnaround time for hardware/printing problems. Again a fairly quick turnaround time was required for software problems with 52% of males requiring a response in hours, 26% in minutes; 44.3% of females required a response to software problems in hours with 42.6% requiring a response in minutes. Regarding new installations of hardware or software, the modal response time for females was 2 to 3 days (39.3%) but for males it was 1 day (36%). So for new IT

installations, staff were prepared to wait for longer periods than for software or hardware/printing problems. Regarding new staff accounts set-up, the modal response time for female staff was 1 day (41%) whilst 36% males required a response time of one day; a relatively high proportion (36%) of males required response to the setting up of new staff accounts in hours. In regard to network connectivity programs, both males and females required a faster response time than in terms of setting up new accounts. For example, for male respondents, a response time in minutes (48%) and for females a modal response time in terms of hours (47.5%) was required.

The final five questions addressed various miscellaneous issues including staff development matters. The vast majority of females (91.8%) and males (80%) felt that they had the computer hardware to meet the requirements of their job. However, a greater proportion of female staff (91.8%) than males (78%) felt that they had the computer software necessary to undertake their working responsibilities at the University. A lower but nevertheless majority of both female (68.9%) and male staff (72%) felt that they had the necessary IT support to undertake the task requirements of their job. The modal response in terms of hardware and software training for both females (57.5%) and males (72%) indicated a preference for self-teaching. However, very significant proportion of female staff also learn from peers (26%) in comparison to males (10%). In terms of training provided by the Information Technology Services Department, a greater proportion of female staff (14.8%) access this than males (6%). Staff also were asked to indicate how they wish to receive their IT training. Although in actual fact most were self-taught but very few female staff (1.6%) and males (8%) wish to learn through this method. Indeed a majority of female staff (57.4%) and males (56%) would like to receive IT training through on-site classes in the future. This suggests a significant gap in the IT training capabilities within the university.

STUDENT PERCEPTIONS OF UNIVERSITY IT RESOURCES

As previously stated, the university undertakes subject evaluations where students, inter alia, are required to provide their perceptions of the computer resources available at the University. The second semester 2000 survey provided the following results.

- Full time students (Mean = 3.44) had a slightly more positive perception of their access to computer facilities than part time students (Mean = 3.42, T = 0.61, P is greater than 0.05). However the differences were not statistically significant.

- Female students had a more positive perception (Mean = 3.49) than male students (3.39) regarding access to computer facilities at the University. The differences were highly significant (T = 4.65, P is less than 0.001).

- Students whose first language was not English (Mean = 3.45) had a slightly more positive perception of accessibility of computing facilities than those whose first language was English (Mean = 3.44). However, this difference was not statistically significant (T = 0.42, P is greater than 0.05) suggesting that the difference may be due to chance alone.

- Government funded students (Mean = 3.45) had a more positive perception of their accessibility to computing facilities than fee-paying students (Mean = 3.40), perhaps suggesting that those who are paying full fee wish to obtain value for money. It is noted that the difference was significant at the 5% level only (T = 2.16, P is less than 0.05).

- In summary, the survey results indicate that in terms of computer accessibility, student financing and gender appear to be the key variables where the student perceptions were significantly different.

The same survey instrument was also implemented in 1999 and it would be useful to draw temporal comparisons at the same point in time, that is, 2nd Semester 1999 versus 2nd Semester 2000. It may not be valid to compare 1st Semester and 2nd Semester results due to changes in student population arising from student attrition and 2nd Semester intakes. Accordingly, the following provides comparison of computer facilities perceptions during 2nd Semester 1999 and 2000 at the case study university:

- In terms of attendance mode, full time student perceptions of availability of computing facilities increased from 3.05 in 1999 to 3.44 in 2000. This nearly 13% improvement in full time students' perceptions of IT facilities between 1999 and 2000 was highly significant (T = 20.57, P is less than 0.001). Similarly there was an improvement in the part time students' perception of accessibility of computing facilities from 2.87 in 1999 to 3.42 in 2000. This 19% increase in student perception was highly significant (T = 10.62, P is less than 0.001).

- In terms of gender, male students' perception improved from 3.01 in 1999 to 3.39 in 2000. This 12.6% improvement in male student perception of computing facilities was highly significant (T = 15.74, P is less than 0.001). Similarly there was a 15% improvement in female student perceptions of accessibility to computing facilities from 3.03 in 1999 to 3.49 in 2000 – the difference being highly significant (T = 17.6, P is less than 0.001).

- In terms of language spoken, there was a 16.6% improvement in English speaking students' perceptions of computing facility accessibility from 2.95 in 1999 to 3.44 in 2000 and this difference was highly significant (T = 22.75, P is less than 0.001). The improvement in computing facilities perceptions of non-English speaking background students was less – increasing from 3.19 in 1999 to 3.45 in 2000. However, the increase of 8.2% was highly significant (T = 8.40, P is less than 0.001).

- The perceptions of Government funded students improved by 15.4% between 1999 and 2000 increasing from 2.99 to 3.45 respectively. This improvement in Government students' perception of IT facilities on campus was highly significant (T = 21.25, P is less than 0.001). There was a lower improvement in perception of IT facilities in terms of full fee paying students from 3.08 in 1999 to 3.4 in 2000. However, 10.4% increase in students' perception was highly significant (T = 10.17, P is less than 0.001).

DISCUSSION AND CONCLUSION

The case study is a "Government" funded university that has had its publicly provided monies very significantly reduced, in common with other Australian higher education institutions since 1997. The government expects such institutions to become more entrepreneurial and bridge the financial gap through such strategies as development of fee paying programs for local and overseas students. In this context the finding that fee-paying students had a more negative perception of the computing facilities on campus should be a source of concern within the university. Clearly the IT infrastructure requires to be improved if the institution is to maintain a competitive position and is capable of growing its non-government income. In this respect the temporal study findings is encouraging since it reveals an improvement in the fee paying students' perception of IT facilities between 1999 and 2000.

The faculty and support staff perceptions of the IT environment at this institution was similarly somewhat disconcerting with the servers and network infrastructure requiring a major rehabilitation. Fortunately, the relatively recently appointed head of the Information Technology Services department has commenced the repair of the system through the upgrading and refreshing of the network infrastructure and the installation of redundant links to all campuses. The latter is very

important to the University since it has half a dozen campuses in Australia and three in overseas locations. The greater use of flexible and on-line learning methods has added urgency to these tasks.

The fact that 21.3% of women and 24% of man respondents felt that the University's IT staff were "not really" or "not at all" responsive to their information technology needs is a source of concern to the department. The relatively new IT Director has been attempting to change the IT staff culture towards greater client focus and has made some key appointments to this end. It is important that support areas of the university embrace this move towards "customer service" if the quality of their output and outcomes is to be continuously improved in the future. With the recent establishment of the Australian University Quality Agency by the federal government even greater impetus will be given by Australian universities to the notion of continuous quality improvement – whether it is regarding academic or service delivery.

Universities are often good at educating their students but pay insufficient heed to the maintenance of the currency of their staff knowledge in terms of IT. At the case study institution most staff were quite confident in the use of word processors, worldwide web and e-mail. Nevertheless significant proportion of staff lacked confidence in the application of graphic/drawing programs, spreadsheets and database software. Surveys such as this can guide the development and delivery of IT staff development programs so as to gain the maximum advantage from such courses. However, the half life of IT knowledge is relatively low and hence the importance of regular staff surveys to identify training needs is critical, if staff are to remain optimally productive in the discharge of their responsibilities.

It is also significant that a majority of staff at this university prefer to update their IT knowledge through on-site classes. However, currently a majority of staff are forced to learn by themselves, suggesting a significant gap between actual and preferred learning methods. While not denying the need to develop independent and life long learners, it is important that the university provides a good mix of IT teaching and learning methods to suit the reasonably wide range of preferred staff learning styles.

REFERENCES

Ballantyne, C. (1998) Survey of student use of Information Technology at Murdoch University, published at the Murdoch University website < http:\\cleo.murdoch.edu.au/evaluation/IT survey.html>.

Beeharry, A and Schneider, G.M. (1996) Creating a campus network culture in a newly developing economy, *Information Technology for Development*, Vol. 7 Issue 1, March 1996.

George Mason University, "Information Technology Evaluation Has Mixed Results", published at the website <http:\\www.gmu.edu/news/gazette/0011/iteval.html>.

Peebles, CS and Antolovic, L. (1999) Cost (and Quality and Value) of IT support in large Research Universities *Educom Review*, Sep/Oct 1999, Vol. 34, Issue 5.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

NOTICE

Reproduction Basis

[X] This document is covered by a signed "Reproduction Release (Blanket)" form (on file within the ERIC system), encompassing all or classes of documents from its source organization and, therefore, does not require a "Specific Document" Release form.

[ ] This document is Federally-funded, or carries its own permission to reproduce, or is otherwise in the public domain and, therefore, may be reproduced by ERIC without a signed Reproduction Release form (either "Specific Document" or "Blanket").